Cole Crops

- Broccoli (2007)
- Cabbage (2007)
- Broccoli – Side dress Nitrogen Comparisons (2008)
- Cabbage – Side Dress Nitrogen Comparisons (2008)
- Multiple nitrogen product options to enhance the yield and/or maturity of broccoli (2009)

Experiment**: Broccoli**

Year (Experiment Number): 2007 (07-112)
Date of Planting/Harvest: May 19 / July 6-10
Hybrid: Diplomat
Plot Size (replications): 30' x 5' – 3 replications

Soil Test Levels (ppm)	
pH ~ 7.3	P1 ~ 61
CEC ~ 6.3	K ~ 87
OM ~ 1.8%	(3.5% K)

Broccoli is commonly grown early in the spring season or as a fall crop in many areas. Transplants are quickly becoming the favored means of plant establishment in the fields. This allows for the application of fertilizer with the transplant operation to promote growth and establishment. However, in many cases the amount of fertilizer that can be added is quite limited due to salt injury from some fertilizers. Inputs of phosphorus and potassium are commonly made at planting and nitrogen is applied during the growing season. This trial followed these ideas and utilized various Agro-Culture Liquid Fertilizer programs to enhance broccoli establishment and yields. Two ACLF nitrogen products and the use of eNhance® to stabilize 28% UAN were some of the treatments. Comparisons with conventional dry fertilizer products were also made.

- The entire plot area was planted to soybeans in the season prior to this trial. The stubble was lightly worked in the spring with a field cultivator to prepare for establishment of the plots. A yield goal of 10 tons/acre was used with Michigan State University's Vegetable Fertility Guide (E2934) to develop the basic fertility levels.
- The dry fertilizers were broadcast then lightly incorporated then all plots were formed into beds (4" tall x 24" wide).
- On May 21, 2007, "Diplomat" variety broccoli plants were transplanted into the plot area. Each plot was 30' long and consisted of twenty plants in with 18" spacing between plants on alternating side of the bed. A transplant fertilizer and/or water solution at approximately 400 GPA was used to aid in the establishment of these plants, exact products and rates for the fertilizers used are described below. Drip irrigation placed in the center of each plot was used to supply water as necessary during the growing season.

Table B1. Fertility programs for Broccoli production for comparison of various nitrogen fertilizers.

	Treatment (Yield goal = 10 tons/Acre)	**Rate/A (gal/A)**	**Method of Application**
1	Untreated Control	0	NA
	0-0-60+18-46-0+Mn+Zn	144#, 52, 5#, 4#	PPI
	10-34-0	6.3	transplant
2	28% UAN	42	SD
	PG + SK + Micro 500+ Mn	3.7, 6.6, 1 qt, 1 pt	transplant
3	HN	28	SD
	PG + SK + Micro 500+Mn	3.7, 6.6, 1 qt, 1 pt	transplant
4	28% w/ eNhance	36.3	SD
	PG + SK + Micro 500+Mn	3.7, 6.6, 1 qt, 1 pt	transplant
5	NR	35	SD

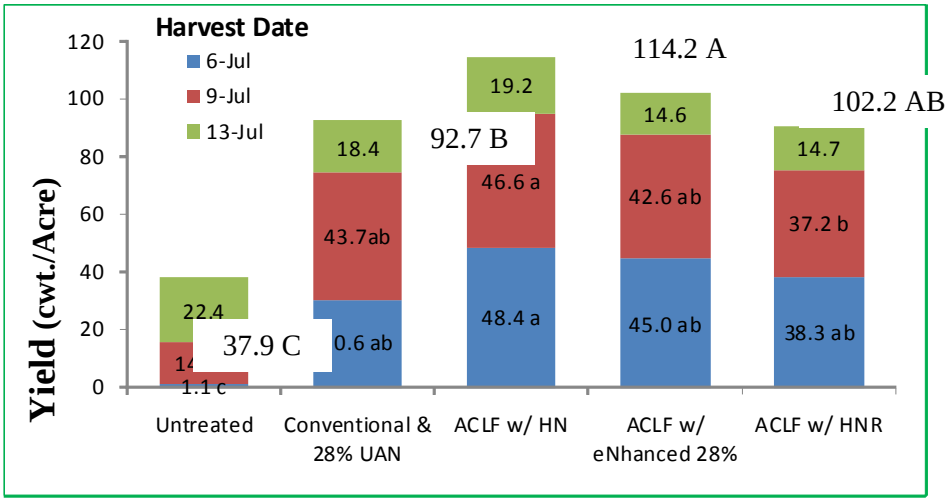
SK = Sure-K, PG=Pro-Germinator, HN = High HRG-N, NR = High HRG-NR, Mn = Manganese Flavanol

- Admire and Ridomil pesticides were applied as a soil drench at the recommended rates of application during transplant. Additional fungicides and insecticides were applied as necessary

throughout the growing season with an air-blast backpack sprayer operated at 10 gallons per acre, ensuring through coverage by these pesticides.

- A single side dress application of nitrogen was made on June 1st to the center of each plot area. The products used and rates of application are described on the previous page.
- The initial broccoli harvest date was based on the crop development in the most mature plots. After the second harvest, over 98% of the primary heads had been collected from several treatments. The broccoli heads for the third harvest was predominately from primary head development in some later maturing treatments.

Chart B1. Broccoli yield by harvest date for various nitrogen fertility programs.



Columns or individual harvest followed by different letters are statistically different according to Duncan's Multiple Range Test, ($P \leq 0.05$)

RESULTS:

- Harvesting the broccoli based on crop maturity of select plots significantly limited the total harvests from some treatments. However, this practice could quantify the earliness and/or advancement in plant maturity for select treatments. The lowest yielding plots would produce more broccoli than was reported for this trial, but the development was significantly delayed.
- The main treatment for this trial was the form of nitrogen utilized. The three ACLF fertility programs all utilized the same transplant solution, so the nitrogen was the only difference in these treatments. While Broccoli is a relatively short season crop compared to the release curve for High NRG-N, it still lead to a significant increase over the conventional fertility program that utilized 28% UAN nitrogen, 23% increase in total yields. Additionally, the total yield was 200% greater than the untreated control.
- The ACLF program with eNhanced 28% UAN (80% rate) produced similar yields, but it was also statistically similar to the conventional fertility program for total yield and individual harvest yields.
- The yields from the conventional fertility program and ACLF w/ HNR were statistically similar for all harvests and total yield.
- The first two harvests were only three days apart. Had this trial been conducted with only a single "commercial harvest" on July 9th (second harvest date), the percentage difference in total yield for the ACLF program with High-NRG-N vs. conventional program would have been even greater.

Experiment**: Cabbage**
Year (Experiment Number): 2007 (07-113)
Date of Planting/Harvest: May 1/ August 10th
Hybrid: Tender Sweet F1 *(Johnny's Seed*)
Plot Size (replications): 30' x 5' – 1 replication

Soil Test Levels (ppm)	
pH ~ 7.3	P1 ~ 61
CEC ~ 6.3	K ~ 87
OM ~ 1.8%	(3.5% K)

Cabbage is a Cole crop that is commonly grown in the early spring or fall season. This trial utilized early spring plantings. Inputs of phosphorus and potassium were made at transplant or prior to planting. Nitrogen then is applied as side dress application during the growing season. This trial utilized various Agro-Culture Liquid nitrogen fertilizer products as the main comparison. Pro-Germ and Sure-K were applied with the transplant solutions. Comparisons with conventional fertilizer products were also made.

- The entire plot area was planted to soybeans in the season prior to this trial. The stubble was lightly worked in the spring with a field cultivator to prepare for establishment of the plots. A yield goal of 10 tons/acre was used with Michigan State University's Vegetable Fertility Guide (E2934) to develop the basic fertility levels.
- The dry fertilizers were broadcast then lightly incorporated then all plots were formed into beds (4" tall x 24" wide).
- On May 21, 2007, "Tendersweet" variety cabbage plants were transplanted into the plot area. Each plot was 30' consisted of twenty plants in with 18" spacing between plants on alternating side of the bed. A transplant solution and/or water at approximately 400 GPA was used to aid in the establishment of these plants, exact products and rates for the fertilizers used are described below. Drip irrigation placed in the center of each plot was used to supply water as necessary during the growing season
- Admire and Ridomil pesticides were applied as a soil drench at the recommended rates of application during transplant. Additional fungicides and insecticides were applied as necessary through out the growing season with an air-blast backpack sprayer operated at 10 gallons per acre, ensuring through coverage by these pesticides.
- The side dress nitrogen application were made to the center of each plot area on June 1st.

Table C1. Cole Crop Fertility Program Comparisons Utilized in 2007.

Treatment	(Yield goal = 10 tons/Acre)	**Rate / Acre – (Gal/Acre)**	**Method**
1	Untreated Control	0	na
	0-0-60+18-46-0+Mn+Zn	144#, 52#, 5#, 4#	PPI
	10-34-0	6.3	transplant
2	28% UAN	42	SD
	PG + SK + Micro 500+ Mn	3.7, 6.6, 1 qt, 1 pt	transplant
3	High NRG-N	28	SD
	PG + SK + Micro 500+Mn	3.7, 6.6, 1 qt, 1 pt	transplant
4	High NRG-NR	35	SD

SK = Sure-K, PG=Pro-Germinator, HN = High HRG-N, NR = High HRG-NR, Mn = Manganese Flavanol

- The all cabbage heads were harvested on a single date according to development in the most mature plots. Despite many heads being immature at this harvest date, delaying harvest would

have resulted in cracking of the heads in some other treatments. Therefore, yields are partially a factor of maturity and not full yield potential for some treatments.

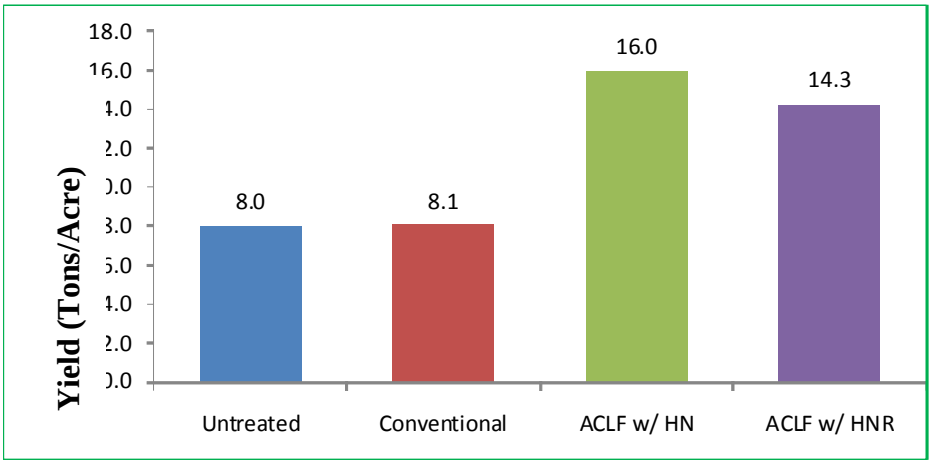


Chart C1. Yield response of cabbage to various fertility programs.

RESULTS:

- The cabbage yield for the conventional fertility program and the untreated control plots were essentially identical at harvest. Most of the heads in these treatments were immature and smaller than would be acceptable for a commercial harvest. Additional time would be necessary to achieve full maturity and potentially separate the yields for the conventional fertility program from the untreated program.
- Cabbage heads were mature to the point of nearly bursting in both ACLF fertility programs, therefore harvest was initiated. The resulting yields showed the heads to be twice as large as those found with the conventional fertility program (100% increases). Because there was only one replication for this trial, statistical analysis was not possible. Still, the heads were visually larger and the measured yields were dramatically increased over the untreated control and the conventional fertility program.
- Delaying the harvest for the untreated control and the conventional fertility program would have greatly improved the yield per acre for these treatments. However, maturity is a factor for most vegetable crops that can add value and this method of harvest clearly showed that the ACLF fertility programs promoted more rapid growth and development of cabbage. Had this been a commercial cabbage field planted in the early spring, the ACLF fertility programs would have allowed for earlier harvest and greater time for any subsequent crop to be produced. Additionally, fewer insecticide and/or fungicide applications and lower amounts of irrigation would have been required when the crop matures in a shorter period of time, further increasing the profitability form the use of ACLF products.

Experiment: Broccoli – Side dress Nitrogen Comparisons
Year (Experiment Number): 2008 (08-112)
Date of Planting/Harvest: May 19 / July 6-20
Hybrid: Diplomat
Plot Size (replications): 35' x 5' – 3 replications

Soil Test Levels (ppm)	
pH ~ 7.3	P1 ~ 61
CEC ~ 6.3	K ~ 87
OM ~ 1.8%	(3.5% K)

Broccoli is commonly grown early in the spring season or as a fall crop in many areas. Transplants are quickly becoming the favored means of plant establishment in the fields. This allows for the application of fertilizer with the transplant operation to promote growth and establishment. However, in many cases the amount of fertilizer that can be added is quite limited due to salt injury from some fertilizers. Inputs of phosphorus and potassium are commonly made at planting and nitrogen is applied during the growing season. This trial followed these ideas and utilized various Agro-Culture Liquid Fertilizer programs to enhance broccoli establishment and yields. Two ACLF nitrogen products and the use of eNhance ™ to stabilize 28% UAN were some of the treatments. Comparisons with conventional dry fertilizer products were also made.

- The entire plot area was planted to melons in the season prior to this trial. The stubble was chisel plowed in the fall and lightly worked in the spring with a field cultivator to prepare for establishment of the plots. A yield goal of 10 tons/acre was used with Michigan State University's Vegetable Fertility Guide (E2934) to develop the basic fertility levels. The base N: P_2O_5: K_2O rates used for all plots were 160, 40 and 86 pounds per acre respectively.
- The dry fertilizers were broadcast then lightly incorporated then all plots were formed into beds (4" tall x 24" wide).
- On April 28th "Diplomat" variety broccoli plants were transplanted into the plot area. Each plot was 35' long and consisted of twenty-six plants in with 16" spacing between plants on alternating side of the bed. A transplant fertilizer and/or water solution at approximately 400 GPA was used to aid in the establishment of these plants, exact products and rates for the fertilizers used are described below. Drip irrigation placed in the center of each plot was used to supply water as necessary during the growing season.

Table B1. Fertility programs for Broccoli production for comparison of various nitrogen fertilizers.

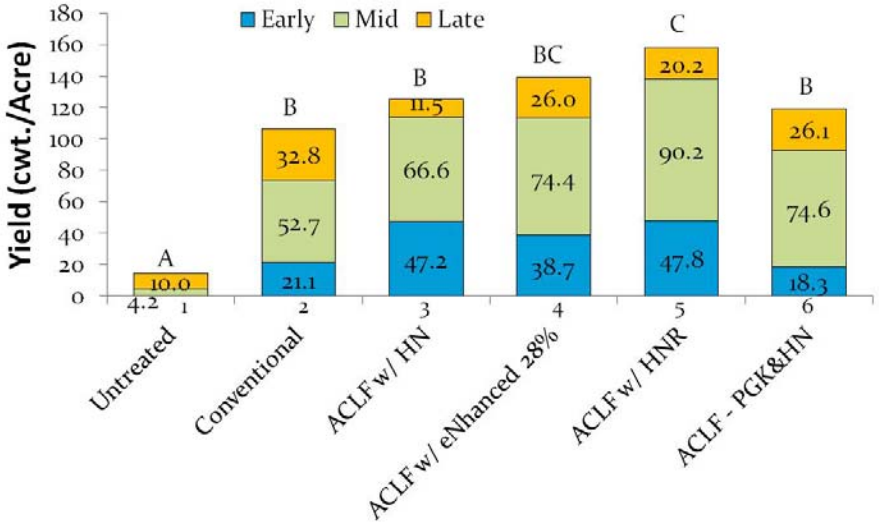
Treatment		Rate/A (gal/A)	Method of Application
1	Untreated Control	0	na
2	0-0-60+18-46-0+Mn+Zn 10-34-0 28% UAN	144#+55#+4#+ 4#, 6 47	PPI transplant SD
3	PG + SK + Micro 500+ Mn HN	3.7+ 6.6+ 3.8 qt+ 2 pt 32	transplant SD
4	PG+SK+Micro 500+Mn 28% w/ eNhance	3.7+ 6.6+ 3.8 qt+ 2 pt 37.6	transplant SD
5	PG+SK+Micro 500+Mn NR	3.7+ 6.6+ 3.8 qt+ 2 pt 40	transplant SD
6	**PG-K** + SK + Micro 500+ Mn HN	3.7+ 6.6+ 3.8 qt+ 2 pt 32	transplant SD

SK = Sure-K™, PG=Pro-Germinator ™, HN = High NRG-N™, NR = High NRG-NR, Mn = Manganese Flavonol

- Admire® and Ridomil® pesticides were applied as a soil drench at the recommended rates of application during transplant. Additional fungicides and insecticides were applied as necessary throughout the growing season with an air-blast backpack sprayer operated at 10 gallons per acre, ensuring through coverage by these pesticides.
- A single side dress application of nitrogen was made on June 1st to the center of each plot area (directly below the drip irrigation tape). The products used and rates of application are described on the previous page in Table B1.
- The early broccoli harvests were based on the crop development in the most mature plots. After the middle harvest, over 98% of the primary heads had been collected from several treatments. The broccoli heads for the third harvest was predominately from secondary heads. Therefore, no further evaluations were completed despite additional primary head development in some later maturing treatments like the untreated control.

RESULTS:

The development and early season vigor of the plants in this trial were reduced due to a frost 4 days after planting. The plants in the untreated control were the most significantly damaged. However, the plants did recover, but crop growth was significantly delayed and resulting yields very poor.



Columns with different letters are significantly different for total yield – Duncan's MRT P< 0.10

Figure B1. 2008 Marketable Broccoli Yields Based on Fertility Program and Harvest Timing

Total yield for the conventional fertility program was similar to three of the ACLF programs, but significantly less then treatment #5. The late harvests were where this treatment produced more broccoli than the ACLF treatments. The maturity of this treatment was therefore delayed compared to the ACLF treatments.

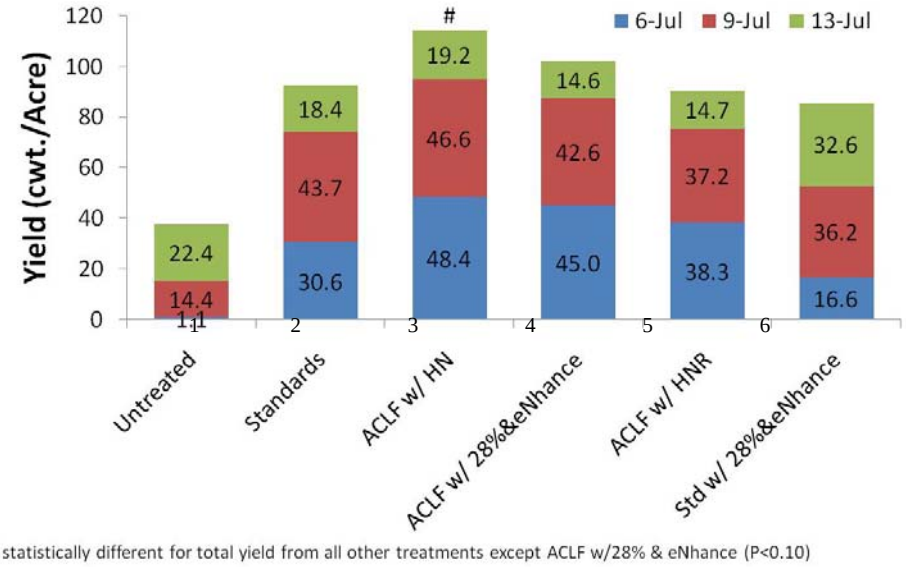
The ACLF fertility program with eNhanced 28% UAN was the second highest yielding fertility program in the 2008 and 2007 (Figure B2) growing seasons demonstrating a consistency in strong early yields as well as total season yields for broccoli.

Among the four ACLF treatments, the comparison of Pro-Germinator (Trt. #3) to PGK (Trt #6). PGK is an experimental formulation of Pro-Germinator. There was little difference in the total yield. The Pro-Germinator fertility program appeared to have greater maturity as noted by the higher early yield values; the PGK had better late harvest values.

The use of High NRG-NR as the nitrogen source resulted in the best yield among all treatments in 2008. It was also significantly greater than the conventional fertility program and two of the other ACLF fertility programs. Yields for this fertility program were clearly ahead of all others after the mid-season harvests as well.

In the 2008 season, the ACLF Base fertility program with High NRG-N (Trt #3) did not yield as well as it did in 2007 (Figure B2). Additionally, the High NRG-NR fertility program (Trt #5) yielded much less during the 2007 season than it did in 2008. While this initially might seem confusing, there might be an easy explanation. The 2008 growing season, especially early, was much cooler than

the 2007 growing season. In 2008 the nitrogen stabilizing benefits of High NRG-N with the cooler conditions may have delayed the nitrogen available for the broccoli in comparison to the High NRG-NR. The quicker nitrogen release curve for the NR formulation had a significant advantage in this cooler growing season. Still, with the warmer conditions in 2007, the High NRG-N was the highest yielding plot. While it is not always possible to predict the growing conditions for any particular season, there may remain opportunities where growers can capitalize on the differences between these two ACLF nitrogen products. Early planting and selected growing areas where conditions early are commonly cool will commonly favor the NR formulation. This knowledge can be used to benefit crop growth and development. Potentially these two products could be mixed in equal portions to accommodate changes across growing seasons. That concept may be evaluated in the 2009 growing season.

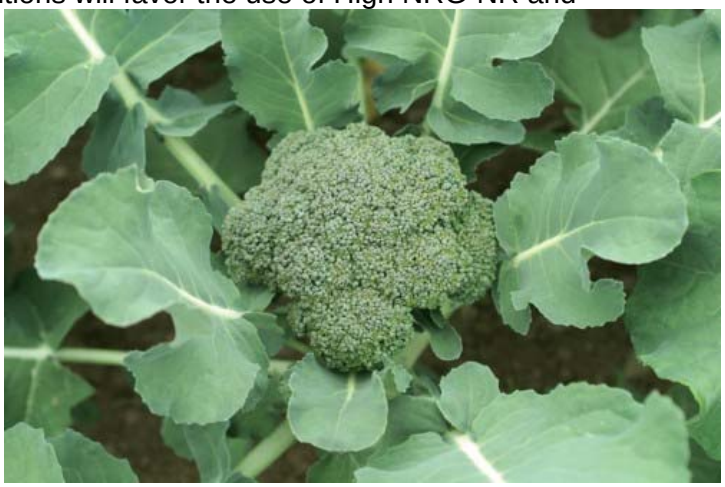


statistically different for total yield from all other treatments except ACLF w/28% & eNhance (P<0.10)

Figure B2. 2007 Marketable Broccoli Yields based on Fertility Programs and Harvest Timing

CONCLUSIONS:

Knowing what the weather conditions will be in the spring can help you select the best nitrogen product to side dress your broccoli. Cool conditions will favor the use of High NRG-NR and warmer soils will favor High NRG-N. However, if you are not great at controlling your weather or predicting it the combination of eNhance with a UAN solution has been the consistent option for both cool and warmer conditions. Each year it out yielded the conventional fertility program with only 80% of the full nitrogen rate.



Experiment: Cabbage – Side Dress Nitrogen Comparisons
Year (Experiment Number): 2008 (08-113)
Date of Planting/Harvest: May 1/ July 11th/ 25th
Hybrid: Tender Sweet F1 *(Johnny's Seed*)
Plot Size (replications): 30' x 5' – 1 replication

Soil Test Levels (ppm)	
pH ~ 7.3	P1 ~ 61
CEC ~ 6.3	K ~ 87
OM ~ 1.8%	(3.5% K)

Cabbage is a Cole crop that is commonly grown in the early spring or fall season. This trial utilized early spring plantings. Inputs of phosphorus and potassium were made at transplant or prior to planting. Nitrogen then is applied as side dress application during the growing season. This trial utilized various Agro-Culture Liquid nitrogen fertilizer products as the main comparison. Pro-Germ and Sure-K were applied with the transplant solutions. Comparisons with conventional fertilizer products were also made.

- The entire plot area was planted to soybeans in the season prior to this trial. The stubble was lightly worked in the spring with a field cultivator to prepare for establishment of the plots. A yield goal of 10 tons (200 cwt) per acre was used with Michigan State University's Vegetable Fertility Guide (E2934) to develop the basic fertility levels. The base N: P_2O_5: K_2O rates used for all plots were 126, 67 and 154 pounds per acre respectively.
- The dry fertilizers were broadcast then lightly incorporated then all plots were formed into beds (4" tall x 24" wide).
- On April 30th, 2008, "Tendersweet" variety cabbage plants were transplanted into the plot area. Each plot was 17.5' consisted of twelve plants in with 16" spacing between plants on alternating side of the bed. A transplant solution and/or water at approximately 400 GPA was used to aid in the establishment of these plants, exact products and rates for the fertilizers used are described below. Drip irrigation placed in the center of each plot was used to supply water as necessary during the growing season
- Admire® and Ridomil® pesticides were applied as a soil drench at the recommended rates of application during transplant. Additional fungicides and insecticides were applied as necessary throughout the growing season with an air-blast backpack sprayer operated at 10 gallons per acre, ensuring through coverage by these pesticides.
- The side dress nitrogen applications were made to the center of each plot area on June 1st.

Table C1. Cole Crop Fertility Program Comparisons Utilized in 2008.

Treatment		Rate/A (gal/A)	Method of Application
1	Untreated Control (UTC)	0	na
2	0-0-60+18-46-0+Mn+Zn 10-34-0 28% UAN	256#+97#+ 4#+ 4# 6 35	PPI transplant SD
3	PG + SK + Micro 500+ Mn HN + SK	5.2+11.8+4 qt +2 pt 25 + 10	transplant SD
4	PG+SK+Micro 500+Mn NR + SK	5.2+11.8+4 qt +2 pt 31.5 + 10	transplant SD

SK = Sure-K™, PG=Pro-Germinator ™, HN = High NRG-N™, NR = High NRG-NR, Mn = Manganese
Flavonol PGK was an alternative formulation of Pro-Germinator evaluated this season.

- Half the cabbage heads in each plot were harvested “early” based on the crop development in the most mature plots. The remaining heads were harvested two weeks later just as cracking of the heads in some treatments was observed. Therefore, six heads of cabbage were harvested from every plot on two different dates.

RESULTS:

The cabbage yield for the conventional fertility program was numerically less, but statistically similar to the ACLF Base fertility program in 2008 for the early and full season harvests.

Individual head size of the cabbage averaged nearly the same for all fertility treatments on both harvest dates. The small advantage in head size for the ACLF Base fertility program was translated into a slight yield advantage for this treatment on both harvest dates. Previous work has shown a very large advantage for the ACLF Base fertility program over conventional fertility programs. Differences in the growing seasons as well as splitting the trial into two harvests this year may have reduced measurable differences among treatments.

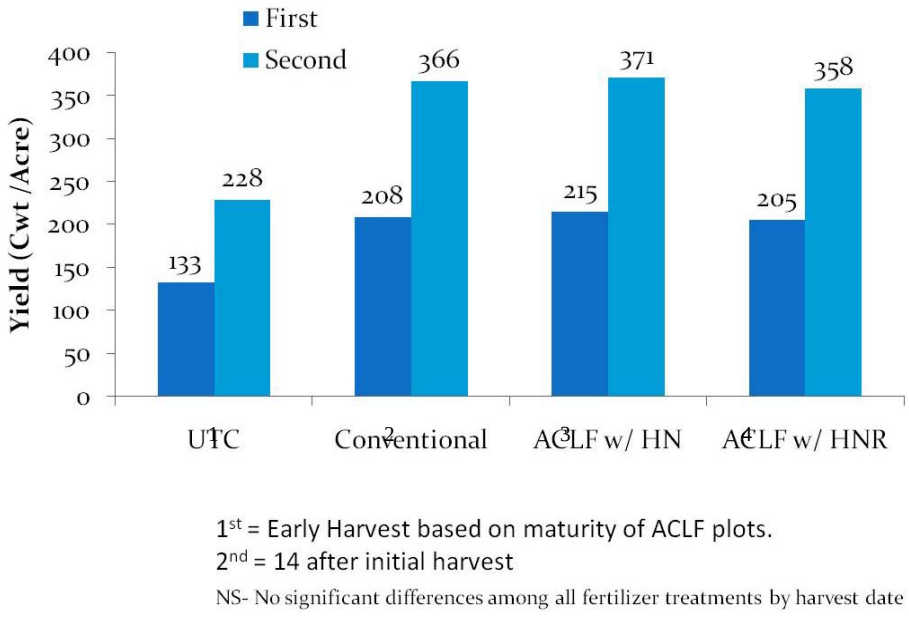


Figure C1. Marketable Yield of Cabbage Based on Fertility Program and Harvest Date

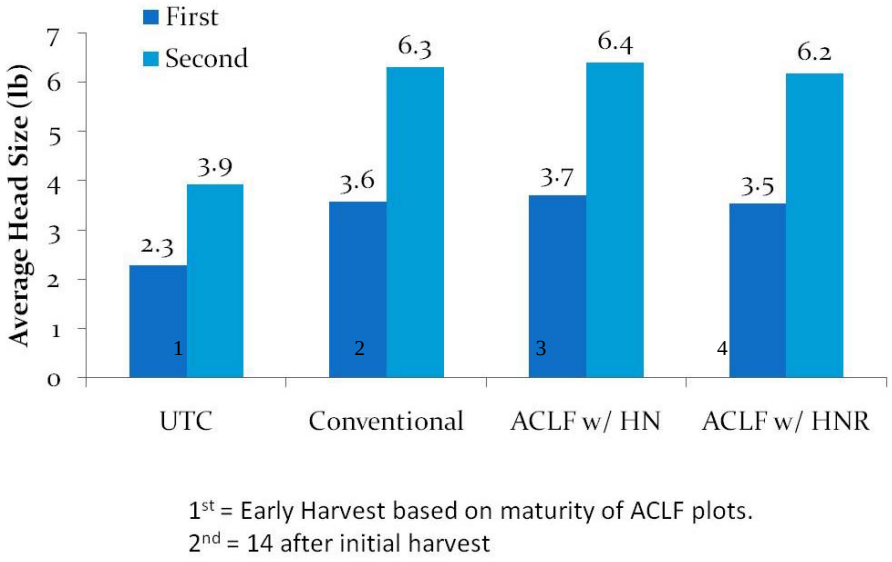


Figure C2. Average Cabbage Head Size Based on Harvest Date and Fertility Program

CONCLUSIONS:

ACLF fertility programs promoted cabbage yields and average head size only slightly in 2008. Prior work has shown a much greater impact on cabbage growth, advancing crop maturity and producing yields well above that of the conventional fertility program. Transplant shock and frost injury were also less with the ACLF Fertility programs compared to the conventional fertility and even the untreated control, data not presented.

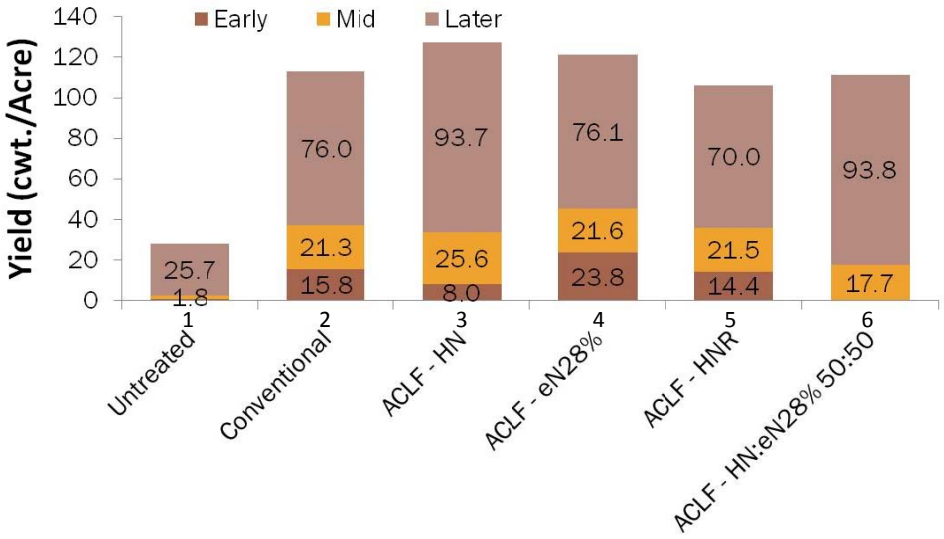
Experiment 09-202: Multiple nitrogen product options to enhance the yield and/or maturity of broccoli.

Planted:	May 11, 2009	**Variety:**	Diplomat	**Population:**	8700
Plot Size:	**1 row x 25' (5' bed)**	**Reps:**	3	**Harvested:**	Multiple
Side dress:	June 12, 2009	**Foliar:**	none		

Soil Test Values *(ppm)*:

pH	CEC	% OM	P1	K	S	% K	% Mg	% Ca	% H	% Na	Zn	Mn	B
7.3	6.5	1.4	69	84	11	2.3	19.1	76.7	-	0.9	1.7	11	0.6

Objectives: To determine if the growth and yield of broccoli is influenced by the type/form of nitrogen fertilizer used. To demonstrate the value of ACLF fertilizers over conventional materials in cool season vegetable crops.



Trt.	Yield	Lb Nutr.	NUE#
2	101.1	296	34.1
3	129.6	113	115
4	105.6	147	71.7
5	101.9	114	89.1
6	113.0	126	89.5

#NUE = Nutrient Use Efficiency
(Lb. Yield/ Total Lb Nutrients applied)

Conclusions:

- I thought the cool growing conditions in 2009 would to favor High NRG-NR which had very positive results under similar conditions in the past. However, this year that trend didn't hold up. The best overall Broccoli yield was achieved when using High NRG-N with the other ACLF fertility components. Maturity was delayed as shown in the early harvest yields that were below most other treatments. However, the later harvest values made this nitrogen program very favorable for total yield.
- For the third year in a row, the eNhanced 28% UAN treatment was the second highest yielding program. This nitrogen product combination had the best early yields in the trial and later harvests that was similar to the conventional program, despite using 20% less nitrogen. Across many different types of seasons, this nitrogen treatment has been very consistent for producing strong yields.
- A 50:50 blend of High NRG-N and eNhanced 28% UAN didn't produce the highest yield in this trial, but is did show one very positive result, uniformity of head development. Crop development was later than other treatments. However, the high degree of head uniformity resulted in strong yields, but delayed harvests. Commercially there would have been similar yields with fewer trips across the field for the harvest crews saving time and labor costs.
- The nutrient use efficiency for all ACLF programs was nearly 3-4X that of the conventional program.

*See *Product Descriptions* in the introduction for more information on ACLF products used.

Table B1. Nitrogen fertility comparisons for impact on the yield and maturity of broccoli, 2009.

	Treatment	Rate/A (gal/A)	Method of Application
1	Untreated Control	0	na
2	0-0-60+18-46-0+Mn+Zn 10-34-0 28% UAN	144#, 55#,4#, 4#, 6 48	PPI transplant SD
3	PG + SK + Micro 500+ Mn HN	3.7, 6.6, 3.8 qt, 2 pt 32	transplant SD
4	PG + SK + Micro 500+Mn eNhanced 28% UAN (80% Trt #2 rate)	3.7, 6.6, 3.8 qt, 2 pt 42.4	transplant SD
5	PG + SK + Micro 500+Mn NR	3.7, 6.6, 3.8 qt, 2 pt 40	transplant SD
6	PG + SK + Micro 500+ Mn HN:eN28 UAN - 50:50 blend	3.7, 6.6, 3.8 qt, 2 pt 36	transplant SD

The plots were established on May 11 by broadcasting the appropriate dry fertilizers listed in above table into the appropriate plot areas and then building raised beds (2ft wide x 4" tall) down the center of each 5 ft wide plot. Broccoli transplants with 3-4 leaves were then planted every 12" on alternating sides of the bed for every plot. Each of the 25 plants in every plot then received 4.2 oz of water containing the appropriate fertilizer solutions as shown in the above table or only water. Sidedress nitrogen applications occurred on June 6th when the plants were approximately 8-10" tall. These nitrogen treatments were knifed down the center of each plot, approximately 4" deep into the soil and 6-8" to the side of each plant. During the course of the growing season, irrigation, fungicides and insecticides were applied uniformly to all plots as necessary. As the broccoli heads began to mature, harvests were conducted once or twice per week to track yields and crop development. After a total of seven harvests (2-3 day interval), all primary heads had been harvested from each plot and no further evaluations were conducted. For data analysis and graphing purposes, yields from individual harvests were combined. The first three harvest dates were combined for the category described as "early." Yields from two harvest dates were combined for the "mid" and "later" categories. The harvest frequency in this trial was not meant to reflect commercial practices, but instead used to identify subtle treatment differences in crop maturity.

#See Appendix "V" for additional equipment, application and irrigation description and information.